

WINTERGREEN RESEARCH, INC.

**Worldwide Solar Residential Panel Market Shares,  
Strategies, and Forecasts 2008 to 2014**

**Residential Use of Solar Panels Lends Energy Independence**



*Picture by Susie Eustis*

**MOUNTAINS OF OPPORTUNITY**

**WinterGreen Research, Inc.  
Lexington, Massachusetts**

[www.wintergreenresearch.com](http://www.wintergreenresearch.com)

REPORT # SH29821672    571 PAGES    140 TABLES AND FIGURES    2008  
\$3,300 SINGLE COPY    \$4,300 WEB SITE HOSTING

## **CHECK OUT THESE KEY TOPICS**

**RESIDENTIAL SOLAR  
PHOTOVOLTAICS  
SOLAR POWER SYSTEMS CONVERT SUNLIGHT INTO ELECTRICITY  
ON-GRID SOLAR ELECTRIC SYSTEMS  
OFF-GRID RESIDENTIAL SOLAR ELECTRIC SYSTEMS  
SOLAR POWER SYSTEM  
PV SYSTEM INTEGRATION  
SOLAR ELECTRIC BASICS  
POLYSILICON  
STAND ALONE PV SYSTEMS  
BACKUP POWER SOLAR  
THIN FILM HYBRID SYSTEMS  
PV CELLS  
PV MODULES  
BIPV  
ON-GRID SOLAR APPLICATIONS  
ON-GRID RESIDENTIAL SOLAR  
OFF-GRID RESIDENTIAL SOLAR**

**Global Warming Drives Solar Energy Adoption**

**Solar Market Forecasts  
Solar Market Shares  
Residential Solar Market Forecasts**

***OPPORTUNITY ABOUNDS***

**WinterGreen Research, Inc.  
Lexington, Massachusetts  
[www.wintergreenresearch.com](http://www.wintergreenresearch.com)**

**REPORT # SH29821672      571 PAGES      140 TABLES AND FIGURES      2008  
\$3,300 SINGLE COPY      \$4,300 WEB SITE HOSTING**

## **Residential Solar Panels: Market Shares, Forecasts, and Strategies, 2008-2014**

Adoption of solar energy has a simple market driving force. If people do not adopt solar energy, the planet will become unfit for human habitation. The fossil fuels are warming the planet at an increasing rate that makes life unsustainable if something does not change.

Global warming drives solar markets. Solar is perceived as the best, perhaps the only widespread solution to global warming. Every large enterprise has adopted a social responsibility strategy that makes a nod toward solving the issues of global warming and embraces renewable energy. Every person in the world is aware of the problems that global warming is bringing.

High growth is forecast for residential solar markets as solar moves to take on a measurable supply of world energy. As penetration from .3% of the world energy supply raises to over 15% in five years, residential uses of solar energy will represent a significant part of the growth. Residential solar energy represents a measure of energy independence for every household, used as hybrid systems independently of, but not completely in place of traditional grid electricity.

It is not economical to put solar generated electricity back on the grid, instead it will be used from batteries where the electricity is stored for later use. Solar systems will initially be used for lighting and charging hybrid and electric vehicles. Traditional grid electricity will only slowly be replaced. Grid hybrid electricity solutions will persist for a long time.

Demand for energy is accelerating as more of the world becomes developed. Developing countries are anticipated to double the worlds demand for energy in the next thirty years. Energy creation is becoming a central environmental issue with air quality, water quality, and flooding because of global warming having implications for the entire world.

Solar energy is a clean, reusable and affordable solution that is increasingly being recognized as the leading alternative energy source for the 21st century. While hybrid solutions are anticipated to evolve with wind, geothermal, and nuclear solutions, evolving as well, solar looks to be a dominant technology. The solar panel size is a trade-off between the amount of money wanted to invest and the amount of electricity needed to produce. A typical US home uses 13,000kWh per year or 5kWp.

On average, the sun radiates 2.6 gigawatts (GW) of energy onto a square mile of the earth's surface, and the most suitable way to harvest that light depends on two factors: cost and the available real estate. It does not matter that thin film solar panels are not more than 10% efficient initially, the roof of the home is not doing anything else except sit there. The sides of the home, the back fence can be used to collect solar energy and that energy can be stored for later use in vehicles and lighting.

This market segmentation is anticipated to shift as the thin film solar panels become commercially viable. The thin film solar panels will be used initially in utility applications, but also in residential applications for fueling motor vehicles. The ability to store energy from solar panels makes them a viable alternative to gasoline. The lithium and lithium ion batteries are a very dense energy storage medium providing incentive for people to put in a modest amount of thin film battery banks recharged by solar panels.

As people do this, the silicon markets keep growing at a steady pace, due to the decrease in the costs for the silicon raw materials due to increased capacity for manufacturing the raw materials and increased demand for the silicon solar panels. The thin film solar panel technology has yet to mature. It is in this segment where the phenomenal growth occurs. Versatile thin film solar products are based on unique manufacturing processes. Sputtering is used to do thin film solutions for solar cell manufacture based on defining a repeatable process. Solar cell efficiencies are in the 9 to 10% range for sputtering implementations, but roof installations are not sensitive to size restrictions.

Thin film solar sputtering technology achieves physical vapor deposition which takes an ion and accelerates it. In this manner, the sputtering is used to knock out a target, depositing uniform films at high rates.

Residential solar markets at \$2.5 billion in 2007 are anticipated to reach \$39.3 billion by 2014. Growth is a result of using residential solar systems to power hybrid and all electric vehicles. Units raise from 74 million solar panels in 2007 to 25.6 billion units in 2014. Growth comes not only because solar power is the cheapest power source which it will be in many cases, but because it fulfills a variety of convenience needs, not the least of which is a way to attack global warming. Every large enterprise has adopted a green strategy in response to public demand for better energy solutions.

## Companies Profiled

### Market Leaders

Sharp Solar  
Schott  
Q-Cells  
Kyocera  
BP Solar  
First Solar  
Isofoton  
Sanyo  
SolarWorld  
SunPower  
Suntech  
Yingli Green Energy

### Market Participants

AES  
Akuo Energy  
Colorado Instruments / SolarWorld  
Concentrix  
Cypress Semiconductor / Sunpower  
Dyesol Limited  
Evergreen Solar  
Flisom  
GE  
Global Solar Energy  
Hitachi America Ltd.  
Hoku Scientific  
Isofoton  
Kyocera  
LDK Solar Co LTD  
Mitsubishi  
Nanosolar  
PrimeStar Solar

Q-Cells AG  
Sanyo  
SatCon  
Signet Solar  
Siemens  
Solaire Direct  
Solarfun Power Holdings Co, Ltd.  
Solar Integrated  
SolarWorld AG  
Solartech  
Solon  
Spectra Watt / Intel  
Tenesol  
Urbasolar  
Yingli Green Energy

## Solar Residential Market Strategies, Shares, and Forecasts 2008-2014

### REPORT METHODOLOGY

THIS IS THE 388TH REPORT IN A SERIES OF MARKET RESEARCH REPORTS THAT PROVIDE FORECASTS IN COMMUNICATIONS, TELECOMMUNICATIONS, THE INTERNET, COMPUTER, SOFTWARE, TELEPHONE EQUIPMENT, HEALTH EQUIPMENT, AND ENERGY. THE PROJECT LEADERS TAKE DIRECT RESPONSIBILITY FOR WRITING AND PREPARING EACH REPORT. THEY HAVE SIGNIFICANT EXPERIENCE PREPARING INDUSTRY STUDIES. FORECASTS ARE BASED ON PRIMARY RESEARCH AND PROPRIETARY DATA BASES. FORECASTS REFLECT ANALYSIS OF THE MARKET TRENDS IN THE SEGMENT AND RELATED SEGMENTS. UNIT AND DOLLAR SHIPMENTS ARE ANALYZED THROUGH CONSIDERATION OF DOLLAR VOLUME OF EACH MARKET PARTICIPATION IN THE SEGMENT. INSTALLED BASE ANALYSIS AND UNIT ANALYSIS IS BASED ON INTERVIEWS AND AN INFORMATION SEARCH. MARKET SHARE ANALYSIS INCLUDES CONVERSATIONS WITH KEY CUSTOMERS OF PRODUCTS, INDUSTRY SEGMENT LEADERS, MARKETING DIRECTORS, DISTRIBUTORS, LEADING MARKET PARTICIPANTS, OPINION LEADERS, AND COMPANIES SEEKING TO DEVELOP MEASURABLE MARKET SHARE. OVER 200 IN DEPTH INTERVIEWS ARE CONDUCTED FOR EACH REPORT WITH A BROAD RANGE OF KEY PARTICIPANTS AND INDUSTRY LEADERS IN THE MARKET SEGMENT. WE ESTABLISH ACCURATE MARKET FORECASTS BASED ON ECONOMIC AND MARKET CONDITIONS AS A BASE. USE INPUT/OUTPUT RATIOS, FLOW CHARTS, AND OTHER ECONOMIC METHODS TO QUANTIFY DATA. USE IN-HOUSE ANALYSTS WHO MEET STRINGENT QUALITY STANDARDS. INTERVIEWING KEY INDUSTRY PARTICIPANTS, EXPERTS AND END-USERS. OUR RESEARCH INCLUDES ACCESS TO LARGE PROPRIETARY DATABASES. LITERATURE SEARCH INCLUDES ANALYSIS OF TRADE PUBLICATIONS, GOVERNMENT REPORTS, AND CORPORATE LITERATURE.

## YOU MUST HAVE THIS STUDY

REPORT # SH29821672    571 PAGES    140 TABLES AND FIGURES    2008  
\$3,300 SINGLE COPY    \$4,300 WEB SITE HOSTING

## Residential Solar Panel Market Opportunities, Strategies, and Forecasts, 2008 to 2014

### Table of Contents

#### RESIDENTIAL SOLAR PANEL EXECUTIVE SUMMARY

<b>RESIDENTIAL SOLAR PANEL MARKET EXECUTIVE SUMMARY</b>	<b>ES-1</b>
Demand For Energy	ES-1
Solar Conditions	ES-4
Solar Energy Residential Market Forecasts	ES-4
Solar Residential Market Shares	ES-5
Worldwide Residential Solar Cell and Panel Shipment Forecasts	ES-6
Issues Of Global Warming And Embracing Renewable Energy	ES-10
Sharp Residential Solar Vision	ES-12
Miasolé	ES-16
Flisom Thin-Film Solar Technology	ES-17
PrimeStar Solar	ES-18
Nanosolar Funding	ES-18
Q-Cells Business Strategy	ES-19

#### RESIDENTIAL SOLAR PANEL MARKET DESCRIPTION AND MARKET DYNAMICS

<b>1. SOLAR RESIDENTIAL MARKET DESCRIPTION AND MARKET DYNAMICS</b>	<b>1-1</b>
1.1 Photovoltaics	1-1
1.1.1 Solar Power Systems Convert Sunlight Into Electricity	1-2
1.1.2 On-Grid Solar Electric Systems	1-3
1.1.3 Off-Grid Residential Solar Electric Systems	1-3
1.1.4 Solar Power System	1-3
1.1.5 PV System Integration	1-4
1.1.6 Solar Electric Basics	1-5
1.2 Industry-Wide Shortage Of Polysilicon	1-7
1.2.1 Stand Alone PV Systems	1-8
1.2.2 Backup Power Solar / Wind / Thin Film Hybrid Systems	1-9
1.3 PV Cells	1-9
1.3.1 PV Modules	1-9
1.3.2 BIPV	1-10
1.4 Solar Thermal Energy Used For Heating Or Hot Water Production	1-11
1.5 Solar Energy Key Facts:	1-12
1.6 Solar Power Impacts	1-13
1.6.1 First Solar and the Environment	1-13
1.7 The Colton Electric Utility Carport With Schott Solar	1-15
1.8 Applications of PV Solar Electricity	1-21
1.8.1 On-Grid Applications	1-21
1.8.2 On-grid Residential Solar	1-22

**REPORT # SH29821672      571 PAGES      140 TABLES AND FIGURES      2008**

**\$3,300 SINGLE COPY      \$4,300 WEB SITE HOSTING**

**RESIDENTIAL SOLAR PANEL MARKET SHARES, AND MARKET FORECASTS**

<b>2. RESIDENTIAL SOLAR MARKET SHARES AND MARKET FORECASTS</b>	<b>2-1</b>
2.1 Demand For Energy	2-1
2.1.1 Solar Conditions	2-1
2.1.2 Benefits of Solar For Residential Markets	2-2
2.1.3 Solar Energy Adoption Is A Green Decision	2-5
2.1.4 Solar Energy Market Driving Forces	2-5
2.1.5 Impact of Financial Market Capital Infusion On Solar Initiatives	2-7
2.2 Solar Market Shares	2-8
2.2.1 Solar Residential Market Shares	2-12
2.2.2 Sharp Solar Panels	2-16
2.2.3 Kyocera	2-17
2.2.4 Sanyo 2-18	
2.2.5 Q-Cells	2-18
2.2.6 Suntech	2-19
2.2.7 GE	2-19
2.2.8 General Electric Brilliance Pre-Packaged Residential Systems	2-20
2.2.9 GE Energy Roof-Integrated Solar Systems	2-20
2.2.10 SunPower Residential Solar Roof Tiles	2-21
2.2.11 Suntech Power	2-21
2.2.12 Schott Solar	2-22
2.3 Solar Residential Market Forecast Analysis	2-22
2.3.1 Worldwide Residential Solar Cell and Panel Shipments	2-23
2.3.1 Worldwide Large Residential Solar Cell and Panel Shipments	2-28
2.3.1 Worldwide Mid Size Residential Solar Cell and Panel Shipments	2-30
2.3.1 Worldwide Small Residential Solar Cell and Panel Shipments	2-33
2.3.2 Solar Energy Residential Market Forecasts	2-37
2.3.3 Industry-Wide Shortage Of Polysilicon	2-38
2.3.4 Shortage Of Crystalline Silicon	2-39
2.3.5 Polysilicon Prices Going Up In Near Term Then Going Down	2-39
2.3.6 Solartech Pricing	2-41
2.3.7 Crystalline Silicon Solar Cells, Crystalline Silicon Solar Modules, And Thin Film Solar Modules	2-41
2.3.8 Miasolé	2-46
2.3.9 First Solar Materials and Product Design	2-49
2.3.10 Other Companies	2-50
2.3.11 Crystalline Silicon Wafers Vs Thin Film Amorphous	2-50
2.4 Residential Solar Competitive Analysis	2-51
2.4.1 Renewable Energy as Market Driving Force For Solar Power Adoption Worldwide	2-53
2.4.2 Small Scale PV Power Systems In Developing Areas	2-53
2.5 Incremental Household Use of Solar Systems in Residential Markets	2-54
2.6 Sunshine Index	2-55
2.7 Residential Solar Tech Pricing	2-56
2.8 Residential Solar Regional Analysis	2-58
2.8.1 Germany	2-62
2.8.2 Spain	2-62

**REPORT # SH29821672      571 PAGES      140 TABLES AND FIGURES      2008**

**\$3,300 SINGLE COPY      \$4,300 WEB SITE HOSTING**

## WINTERGREEN RESEARCH, INC.

2.8.3	US	2-62	
2.8.4	Japan	2-64	
2.8.5	SunTech Regional Revenues		2-65
2.8.6	Yingli Green Regional Analysis		2-66
2.8.7	First Solar		2-70
2.8.8	Kyocera		2-71
2.8.9	Solar Photovoltaic Industry Expands in Jiangxi		2-72
2.8.10	SolarTech Regional Revenue Analysis		2-73
2.8.11	South Africa		2-74
2.8.12	Schott		2-75

## RESIDENTIAL SOLAR PANEL PRODUCTS

<b>3. RESIDENTIAL SOLAR PRODUCTS</b>			<b>3-1</b>
3.1	Sharp Solar Products		3-1
3.1.1	Sharp Solar Systems:		3-1
3.1.2	Sharp OnEnergy Solar System		3-2
3.1.3	Sharp Multi-Purpose Module		3-4
3.1.4	Sharp Residential System Module		3-6
3.1.5	Sharp OnEnergy Solar System Prices		3-10
3.2	Q-Cells		3-15
3.2.1	Q-Cells Key Position In The Solar Cell Photo-Voltaic Supply Chain		3-16
3.3	Kyocera		3-20
3.3.1	Kyocera Solar Capabilities		3-21
3.3.2	Kyocera Water Pumping		3-25
3.3.3	Kyocera Lighting		3-26
3.3.4	Kyocera Solar Stand Alone System		3-26
3.3.5	Kyocera Solar Home Systems		3-27
3.3.6	Kyocera Rural Development Vaccine Refrigeration		3-27
3.3.7	Kyocera Vaccine Refrigeration and Clinics		3-27
3.3.8	Kyocera Solar Modules And Components		3-30
3.3.9	Kyocera d.Blue Solar Module		3-30
3.4	Suntech		3-34
3.4.1	Suntech First Phase Polysilicon Supply Agreement With Nitrol Solar, Suntech Power First Phase Agreement Asia Silicon Co., Ltd.		3-35
3.4.2	Suntech MSK Solar Design Products		3-36
3.5	Sanyo		3-36
3.5.1	Sanyo HIT (Heterojunction with Intrinsic Thin layer) Bifacial Solar Cells Proprietary Technology		3-38
3.5.2	Sanyo HIT Double Solar Panels Structure		3-38
3.5.3	Sanyo Silicon Wafers		3-39
3.5.4	Sanyo Amorphous Solar Cells		3-43
3.5.5	Sanyo Amorton Series		3-43
3.5.6	Sanyo Amorton Cells		3-44
3.5.7	Sanyo Amorton Film		3-45
3.5.8	Sanyo Flexible Amorton		3-46
3.5.9	Sanyo Amorphous Photosensors		3-46
3.5.10	Sanyo Amorphous Products Amorton Cells		3-49
3.5.11	Sanyo Amorton Film		3-49
3.5.12	Sanyo Flexible Amorton		3-49
3.5.13	Sanyo Amorphous Photosensors		3-50
3.6	First Solar Materials and Product Design		3-51
3.7	GE Solar		3-53
3.7.1	GE Energy GEvpv-185-Mc 200 Watt Photovoltaic Module For 600 Volt Applications		3-55

**REPORT # SH29821672      571 PAGES      140 TABLES AND FIGURES      2008**

**\$3,300 SINGLE COPY      \$4,300 WEB SITE HOSTING**

## WINTERGREEN RESEARCH, INC.

3.7.2	GE Energy Roof-Integrated Solar Systems	3-56
3.7.3	GE Solar Products And Service	3-57
3.7.4	GE Energy and Rockefeller Center Christmas Tree	3-59
3.7.5	General Electric Residential Solar Modules	3-60
3.7.6	General Electric Brilliance Pre-Packaged Residential Systems	3-64
3.7.7	General Electric Brilliance Wireless Solar Meter	3-66
3.8	SunPower Residential Panels	3-68
3.8.1	SunPower Residential Solar Roof Tiles	3-70
3.8.2	SunPower Performance Monitoring	3-72
3.9	BP Solar	3-73
3.9.1	BP Solar Installation And Operation	3-79
3.10	Schott Solar Panels	3-81
3.10.1	Schott SAPC-175 Solar 175 Watt Photovoltaic Module Panels	3-81
3.11	Miasolé	3-83
3.12	PrimeStar Solar	3-84
3.13	Nanosolar 1 GW CIGS PV Production Tool	3-85
3.14	Flisom	3-85
3.15	Fraunhofer ISE Screen-Printed Solar Cells Variety of Colors and Patterns	3-89
3.16	Dyesol	3-91
3.17	Hitachi	3-91
3.18	Signet Solar	3-92
3.18.1	Signet Solar Thin Film PV Module Technology	3-93
3.18.2	Signet Solar Amorphous and Micro-crystalline Silicon Modules	3-94
3.18.3	Signet Solar Amorphous and Micro-crystalline Silicon Modules Use of Mainstream, Large Area Manufacturing	3-94

## RESIDENTIAL SOLAR PANEL TECHNOLOGY

<b>4. RESIDENTIAL SOLAR TECHNOLOGY</b>	<b>4-1</b>	
4.1	How Solar Cells Work	4-1
4.1.1	90% Of Solar Cells Made From Silicon	4-1
4.1.2	Solar Cells Convert Sunlight to Electricity	4-2
4.1.3	Intensity Of The Photon Flow	4-3
4.2	Solar Technologies	4-4
4.2.1	SunPower Technology	4-4
4.2.2	Types of PV Technologies	4-6
4.2.3	Crystalline Silicon	4-9
4.2.4	Thin-Film PV Technology	4-9
4.2.5	Thin film PV Modules Technology	4-9
4.2.6	Amorphous and Thin Film Silicon	4-12
4.2.7	Highly Efficient Thin-Film Solar Cells	4-12
4.2.8	Developing Technologies: Electrochemical PV cells	4-13
4.3	Filsom Technology	4-14
4.3.1	Dyesol DSC - Dye Solar Cell Technology	4-16
4.3.2	First Solar CdTe Technology	4-18
4.3.3	Copper Indium Diselenide	4-21
4.4	Amorphous Silicon	4-21
4.5	Regional Considerations	4-22
4.6	Solar Panel Standards	4-26

**REPORT # SH29821672      571 PAGES      140 TABLES AND FIGURES      2008**

**\$3,300 SINGLE COPY      \$4,300 WEB SITE HOSTING**

## WINTERGREEN RESEARCH, INC.

4.7	Batteries For Solar Energy Storage	4-27
4.7.1	Thin film batteries (TFB)	4-27
4.7.2	Flooded Lead Acid Batteries	4-28
4.7.3	Absorbed Glass Mat Sealed Lead Acid (AGM)	4-28
4.7.4	MK Gel Cell Batteries	4-29
4.7.5	MK Power-Tech Batteries	4-29
4.8	Solar Research and Development	4-31
4.8.1	Barrier Coatings And Stability Of Thin Film Solar Cells	4-31
4.8.2	High-Efficiency Amorphous Silicon And Nanocrystalline Silicon-Based Solar Cells And Modules	4-32
4.8.3	High Throughput, Low Toxic Processing Of Very Thin, High Efficiency CIGSS Solar Cells	4-33

## RESIDENTIAL SOLAR PANEL COMPANY PROFILES

<b>5</b>	<b>RESIDENTIAL SOLAR PANELS COMPANY PROFILES</b>	<b>5-1</b>
5.1	Major Photovoltaics Companies	5-1
5.1.1	Top Five global Photovoltaics Producers In 2007	5-4
The top five global photovoltaics producers in 2007 accounted for more than half of world production.		
These companies were:		
* Sharp Solar (Japan)		5-5
* Q-Cells (Germany)		5-5
* Kyocera (Japan)		5-5
* Suntech (China)		5-5
* Sanyo (Japan)		5-5
5.1.2	Photovoltaic Industry Associations	5-8
5.2	AES	5-9
5.3	Akuo Energy	5-9
5.4	BP Solar	5-9
5.4.1	BP Solar Integrated Energy Company	5-11
5.4.2	BP Business Strategy	5-13
5.4.3	BP Financials	5-13
5.4.4	BP Revenue	5-14
5.4.5	BP Customers and Testimonials	5-19
5.5	Colorado Instruments / SolarWorld	5-19
5.6	Concentrix	5-21
5.6.1	Concentrix Highly efficient Flatcon System	5-21
5.7	Cypress Semiconductor / Sunpower	5-22
5.7.1	Cypress Semiconductor / SunPower	5-23
5.8	Dyesol Limited	5-23
5.8.1	Dyesol Solar Cell (DSC) TechnologyPartnerships	5-24
5.9	Evergreen Solar	5-25
5.9.1	Evergreen Solar String Ribbon Technology	5-25
5.9.2	Evergreen Solar Contracts and Facilities	5-26
5.10	First Solar	5-27
5.10.1	First Solar 2008 Second Quarter Revenue	5-27
5.10.2	First Solar Revenue	5-28
5.10.3	First Solar 2007 Third Quarter Revenue	5-28
5.10.4	First Solar Advanced Thin Film Semiconductor Process	5-29
5.10.5	First Solar / AES	5-30
5.10.6	First Solar Acquisition of Turner Renewable Energy	5-31
5.10.7	First Solar Manufacturing Capacity	5-31

**REPORT # SH29821672      571 PAGES      140 TABLES AND FIGURES      2008**

**\$3,300 SINGLE COPY      \$4,300 WEB SITE HOSTING**

**WINTERGREEN RESEARCH, INC.**

5.10.8	First Solar Financials	5-32
5.11	Flisom	5-34
5.11.1	Flisom CTI Technology Transfer for Low-Cost Manufacturing	5-35
5.12	GE	5-36
5.12.1	GE Participation In The Solar America Initiative	5-36
5.12.2	GE Energy	5-38
5.13	Global Solar Energy	5-38
5.14	Hitachi America Ltd.	5-39
5.15	Hoku Scientific	5-39
5.15.1	Hoku Scientific Customers	5-40
5.15.2	Suntech Purchases Shares of Hoku Scientific	5-41
5.15.3	Hoku Fuel Cells	5-42
5.16	Isofoton	5-42
5.16.1	Isofoton Revenue	5-43
5.16.2	Isofoton Strategies	5-44
5.16.3	Isofoton Partners	5-47
5.16.4	Isofoton Customers	5-47
5.17	Kyocera	5-47
5.17.1	Kyocera Revenue	5-47
5.17.2	Kyocera Segment Information	5-48
5.17.3	Kyocera Business Strategy	5-50
5.18	LDK Solar Co LTD	5-50
5.18.1	LDK Strategic Relationships	5-52
5.19	Mitsubishi	5-52
5.19.1	Mitsubishi Electric	5-54
5.19.2	Mitsubishi Electric Revenue	5-54
5.19.3	Mitsubishi Electric Business Strategy	5-56
5.19.4	Mitsubishi Electric Improving Performance Through Balanced Management	5-57
5.19.5	Mitsubishi Electric Promoting Business-Strengthening Strategies	5-59
5.19.6	Mitsubishi Electric Strengthening Management	5-60
5.19.7	Mitsubishi Electric Growth Strategies	5-60
5.20	Nanosolar	5-61
5.20.1	Nano Solar Power Innovation	5-62
5.20.2	Nanosolar Funding	5-63
5.21	PrimeStar Solar	5-64
5.21.1	GE Makes Strategic Investment In PrimeStar Solar	5-64
5.22	Q-Cells AG	5-65
5.22.1	Q-Cells AG Business and Sales Assessment	5-74
5.22.2	Q-Cells Germany	5-76
5.22.3	Q-Cells Revenue	5-77
5.22.4	Q-Cells Business Strategy	5-79
5.22.5	Q-Cells Partners	5-79
5.22.6	Q-Cells Customers	5-81
5.23	Sanyo	5-81
5.23.1	Sanyo Brand Vision	5-86
5.23.2	Sanyo Revenue	5-87
5.23.3	Sanyo Investors	5-88
5.24	SatCon	5-88
5.24.1	SatCon Revenue	5-89
5.25	Schott Solar Builds US Manufacturing Plant	5-89
5.26	Sharp	5-93
5.26.1	Sharp Solar Revenue	5-101
5.26.2	Sharp Solar Cells Revenue	5-102

**REPORT # SH29821672      571 PAGES      140 TABLES AND FIGURES      2008****\$3,300 SINGLE COPY      \$4,300 WEB SITE HOSTING**

**WINTERGREEN RESEARCH, INC.**

5.26.3	Sharp Solar Partners	5-103
5.27	Signet Solar	5-103
5.27.1	Signet Solar / Solar Farms / Solar Panels	5-104
5.27.2	Signet Solar Commercial Installations	5-104
5.27.3	Signet Solar Building Integrated Photovoltaics (BIPV)	5-105
5.27.4	Signet Solar Remote Habitation	5-105
5.28	Siemens	5-106
5.28.1	Siemens Revenue	5-107
5.28.2	Siemens Business Platform Strategy	5-107
5.29	Solaire Direct	5-110
5.30	Solarfun Power Holdings Co, Ltd.	5-111
5.31	Solar Integrated	5-112
5.31.1	Solar Integrated Building Integrated Photovoltaic (BIPV) Roofing Systems	5-112
5.31.2	Solar Integrated Customers	5-113
5.32	SolarWorld AG	5-113
5.32.1	SolarWorld AG Revenue	5-114
5.32.2	SolarWorld AG Shell Acquisition	5-116
5.32.3	SolarWorld AG Business Strategy	5-116
5.33	Solartech	5-118
5.33.1	Solartech Develops Thin Film Silicon PV Cell Technologies	5-118
5.33.2	Solartech Solar Cell Efficiency	5-119
5.33.3	Solartech Revenue	5-120
5.33.4	Solartech Customers	5-120
5.34	Solon	5-120
5.35	Spectra Watt / Intel	5-121
5.36	SunPower	5-121
5.36.1	Sunpower High-Efficiency Solar Cells And Multi-Megawatt Solar Power Systems	5-121
5.36.2	SunPower Financials	5-122
5.36.3	Cypress Semiconductor / SunPower	5-122
5.36.4	SunPower Solar Utility-Scale Power	5-124
5.36.5	SunPower 23.4 Percent Efficiency Prototype Solar Cell	5-125
5.36.6	SunPower Revenue	5-126
5.36.7	SunPower Partners	5-128
5.37	Suntech	5-129
5.37.1	Suntech Acquisitions	5-131
5.37.2	Suntech / Hoku Scientific	5-131
5.37.3	Suntech / Suntech Power (Korea)	5-132
5.37.4	Suntech / Nitol Solar	5-132
5.37.5	SunTech Revenue	5-132
5.37.6	Suntech Regional Revenue Analysis	5-133
5.38	Tenesol	5-138
5.39	Urbasolar	5-138
5.40	Yingli Green Energy	5-138
5.40.1	Yingli Green Energy Revenue	5-140
5.40.2	Yingli Business Strategy	5-143
5.40.3	Customers	5-144

**RESIDENTIAL SOLAR PANEL COMPANY LISTS**

<b>6. SOLAR COMPANIES</b>	<b>6-1</b>
6.1 Lists of Solar Companies	6-1
6.2 Note On Lists	6-143

**REPORT # SH29821672      571 PAGES      140 TABLES AND FIGURES      2008****\$3,300 SINGLE COPY      \$4,300 WEB SITE HOSTING**

**List of Tables and Figures****RESIDENTIAL SOLAR PANEL EXECUTIVE SUMMARY**

Table ES-1 Residential Solar Energy Market Driving Forces	ES-2
Table ES-1 (Continued) Residential Solar Energy Market Driving Forces	ES-3
Figure ES-2 Worldwide Residential Solar Cells and Panels Shipments Market Shares, Dollars, First Half 2008	ES-5
Figure ES-3 Worldwide Total Residential Solar Cell and Panel Shipments, Market Forecasts, Dollars, 2008-2014	ES-6
Figure ES-4 Worldwide Residential Crystalline Silicon Solar Cell Segment Market Forecasts, Dollars, 2008-2014	ES-8
Figure ES-5 Worldwide Residential Thin Film Solar Cell Segment Market Forecasts, Dollars, 2008-2014	ES-9
Table ES-6 Worldwide Residential Crystalline Silicon Solar Cell Segment Market Forecasts, Dollars, 2008-2014	ES-10
Figure ES-7 Sharp Residential Solar Video Vision	ES-12
Figure ES-8 Flisom Thin-Film Solar Technology	ES-17

**RESIDENTIAL SOLAR PANEL MARKET DESCRIPTION AND MARKET DYNAMICS**

Table 1-1 Solar Power Systems On Grid Disadvantages	1-2
Table 1-2 Solar Electric Basic Technologies	1-5
Table 1-3 Stand Alone PV Systems Aspects	1-8
Table 1-4 BIPV Solar module advantages	1-10
Table 1-6 First Solar Modules	1-14
Figure 1-6 Energy Mix: German State vs. California Utility	1-15
Figure 1-7 California Colton Electric Utility Carport For Charging Cars	1-16
Table 1-8 California Colton Electric Utility Carport Technical Specifications	1-17
Table 1-9	1-19

**REPORT # SH29821672      571 PAGES      140 TABLES AND FIGURES      2008****\$3,300 SINGLE COPY      \$4,300 WEB SITE HOSTING**

Solar Employee Parking Technical Specifications Figure 1-10	1-20
Riverside Public Utilities Operation Schott Solar Curved Beam Carport Design	

**RESIDENTIAL SOLAR PANEL MARKET SHARES, AND MARKET FORECASTS**

Table 2-1	2-3
Benefits Of Solar For Residential Markets Table 2-1 (Continued)	2-4
Benefits Of Solar For Residential Markets Table 2-2	2-6
Residential Solar Energy Market Driving Forces Table 2-2 (Continued)	2-7
Residential Solar Energy Market Driving Forces Figure 2-3	2-9
Worldwide Solar Cells and Panels Market Shares, First Half 2008 Figure 2-4	2-10
Worldwide Solar Market Shares, 2007 Table 2-5	2-11
Worldwide Solar Cell and Panel Shipments, Market Shares, Dollars 2007 and First Half 2008 Figure 2-6	2-12
Worldwide Residential Solar Cells and Panels Shipments Market Shares, Dollars, First Half 2008 Figure 2-7	2-13
Worldwide Residential Solar Cells and Panels Shipments Market Shares, Dollars, 2007 Table 2-8	2-14
Worldwide Solar Residential Solar Cell and Panel Market Shares, Shipments, 2007 and First Half 2008 Figure 2-9	2-24
Worldwide Total Residential Solar Cell and Panel Shipments, Market Forecasts, Dollars, 2008-2014 Figure 2-10	2-25
Worldwide Total Residential Solar Cell and Panel Shipments, Market Forecasts, Units, 2008-2014 Table 2-11	2-25
Worldwide Total Residential Solar Cell and Panel Shipments, Market Forecasts, Units and Dollars, 2008-2014 Table 2-12	2-26
Worldwide Total Residential Solar Cell and Panel Segment Shipments, 2008-2014 Figure 2-13	2-28
Worldwide Large Residential Solar Cell and Panel Shipments, 2008-2014 Figure 2-14	2-29
Worldwide Large Residential Solar Cell and Panel Shipments, Units, 2008-2014 Table 2-15	2-30
Worldwide Large Residential Solar Cell and Panel Shipments, Units and Dollars, 2008-2014	

**REPORT # SH29821672      571 PAGES      140 TABLES AND FIGURES      2008****\$3,300 SINGLE COPY      \$4,300 WEB SITE HOSTING**

Figure 2-16 Worldwide Residential Mid Size Solar Panel Shipments, Market Forecasts, Dollars, 2008-2014	2-31
Figure 2-17 Worldwide Mid Size Residential Solar Panel Shipments, Market Forecasts, Units, 2008-2014	2-32
Table 2-18 Worldwide Mid Size Residential Solar Panel Shipments, Market Forecasts, Units and Dollars, 2008-2014	2-33
Figure 2-19 Worldwide Residential Small Size Solar Cell and Panel Shipments, Dollars, 2008-2014	2-34
Figure 2-20 Worldwide Residential Small Size Solar Cell and Panel Shipments, Units, 2008-2014	2-35
Table 2-21 Worldwide Residential Small Size Solar Cell and Panel Shipments, Units and Dollars, 2008-2014	2-36
Table 2-22 Solar Residential Market Growth Factors	2-37
Figure 2-23 Residential Crystalline Silicon vs. Thin Film Solar Cells	2-42
Figure 2-24 Worldwide Residential Crystalline Silicon Solar Cell Segment Market Forecasts, Dollars, 2008-2014	2-44
Figure 2-25 Worldwide Residential Thin Film Solar Cell Segment Market Forecasts, Dollars, 2008-2014	2-45
Figure 2-26 Worldwide Residential Crystalline Silicon Solar Cell Segment Market Forecasts, Dollars, 2008-2014	2-46
Figure 2-27 Sunshine Index, U.S.	2-55
Figure 2-28 Regional Solar Market Segments, 2007	2-60
Table 2-29 Regional Solar Market Segments, 2007	2-61

**RESIDENTIAL SOLAR PANEL PRODUCTS**

Table 3-1 Sharp NE-80EJEA Powerful Performance Sharp Reliability	3-3
Table 3-2 Sharp ND-62RU2 Solar Roof Module Features	3-5
Table 3-3 Sharp Residential 175 Watt System	3-6
Table 3-4 Sharp Residential 175 Watt System	3-8
Figure 3-5 Sharp 62 Watt Solar Panel	3-9

**REPORT # SH29821672      571 PAGES      140 TABLES AND FIGURES      2008****\$3,300 SINGLE COPY      \$4,300 WEB SITE HOSTING**

Table 3-6	3-10
Sharp OnEnergy Solar System Prices	
Figure 3-7	3-11
Sharp Solar Panel	
Figure 3-8	3-12
Sharp Solar ROI Calculation	
Figure 3-9	3-13
Sharp Solar ROI Calculation	
Figure 3-10	3-14
Sharp Solar ROI Payback Period Calculation	
Table 3-11	3-15
Q-Cells Silicon-Based Photovoltaic Cell Supply Chain	
Table 3-12	3-16
Q-Cells Product Portfolio Variety	
Table 3-13	3-17
Q-Cells Products	
Table 3-14	3-18
Q-Cells Q6LTT3 Solar Cell Anti-Reflective Finish On The Surface	
Table 3-15	3-19
Q-Cells Q6LTT3 Multicrystalline Cell	
Table 3-16	3-19
Q-Cell Q6LQ6LTT Multicrystalline Cell	
Figure 3-17	3-22
Stand Alone Photo Voltaic Systems	
Figure 3-18	3-23
Stand Alone Solar Systems	
Figure 3-19	3-24
Koycera Solar Battery Back up System	
Figure 3-20	3-25
Koycera Solar Electrical Back up System	
Table 3-21	3-29
Kyocera Refrigeration	
Table 3-22	3-31
Kyocera Small Wattage Photovoltaic Module Applications	
Table 3-23	3-32
Kyocera Small Wattage Modules	
Table 3-24	3-34
Basic Types Of Solar Panel Mounting Structures	
Figure 3-25	3-35
Suntech Operations in PV Supply Chain	
Table 3-26	3-37
Sanyo HIP-xxxDA3 Series Applications	
Table 3-27	3-40
Sanyo Silicon Wafers To Maximize Power:	
Table 3-28	3-40
Sanyo Product Power From Both Sides	
Figure 3-29	3-41
HIT Double Solar Panels HIP-xxxDA3 Series	
Figure 3-30	3-42
HIT Standard Solar Panels HIP-xxxBA3 Series	
Table 3-31	3-43
Sanyo Amorphous Solar Cells Features:	

Table 3-32	3-44
Sanyo Amorphous Products	
Table 3-33	3-46
Sanyo Amorphous Photosensor Uses	
Figure 3-34	3-47
Sanyo Amorphous Solar Cells	
Table 3-35	3-48
Sanyo Amorton Series Features:	
Table 3-36	3-50
Applications of Sanyo Amorphous Photosensors	
Figure 3-37	3-51
First Solar Product Design Features	
Table 3-38	3-52
First Solar Key Product Design Features	
Table 3-39	3-53
GE Energy GEPVp-066-G	
Table 3-40	3-54
GE Residential Solar Cell Benefits	
Table 3-41	3-54
GEPV-085 85 WATT PHOTOVOLTAIC MODULE FEATURES	
Table 3-42	3-55
GEPV-085 85 Watt Photovoltaic Module Benefits	
Table 3-43	3-55
GEPVp-185-MC 200 WATT PHOTOVOLTAIC MODULE FEATURES	
Table 3-44	3-56
GE Energy Roof-Integrated Solar Systems Features & Benefits	
Table 3-45	3-58
GE Solar Energy Calculations Depend on Conditions	
Figure 3-46	3-59
GE Energy Roof Integrated Solar Panels	
Figure 3-47	3-61
GE Solar Modules	
Table 3-48	3-62
GE PV-085 (All Countries) 85 Watt Photovoltaic Module	
Table 3-49	3-63
GE PVp-066-G (United States Only)	
Figure 3-50	3-65
GE Residential Brilliance Solar System	
Figure 3-51	3-67
GE Brilliance Wireless Solar Meter Kit	
Figure 3-52	3-68
SunPower Residential Panels	
Table 3-53	3-69
SunPower 205 Solar Panel Benefits	
Table 3-54	3-70
SunPower 210 Solar Panel Benefits	
Figure 3-55	3-71
SunPower SunTiles	
Table 3-56	3-72
SunTile Features and Benefits	
Figure 3-57	3-74
BP ROI Calculation 7 kWatt Residential Solar System	

**WINTERGREEN RESEARCH, INC.**

Figure 3-58	3-75
BP ROI Calculation 4 kWatt Residential Solar System	
Figure 3-59	3-76
BP ROI Calculation 1 kWatt Residential Solar System	
Figure 3-60	3-78
BP Solar Field Mounted System	
Figure 3-61	3-80
BP Solar Roof Mounted Systems	
Table 3-62	3-82
Schott SAPC-175 Solar 175 Watt Photovoltaic Module Panel Features	
Figure 3-63	3-86
Flisom Thin-Film Solar Technology	
Figure 3-64	3-88
Filsom Absorbers Intrinsically Stable	
Figure 3-65	3-89
Screen-Printed Solar Cells	

**RESIDENTIAL SOLAR PANEL TECHNOLOGY**

Figure 4-1	4-5
SunPower Solar Panel	
Table 4-2	4-6
Solar Photovoltaic Cell Types	
Table 4-3	4-7
Solar CIS/CIGS Systems And Modules By Application	
Table 4-4	4-7
Types of PV Technologies	
Table 4-4 (Continued)	4-8
Types of PV Technologies	
Figure 4-5	4-11
Thin Film Solar Modules Cell Spectral Response	
Table 4-6	4-13
Solar CIS/CIGS Systems And Modules By Application	
Figure 4-7	4-14
Thin-Film Solar Technology	
Figure 4-8	4-15
Green Dye Synthetic Chlorophyll	
Figure 4-9	4-16
Basic Idea Of Cigs Solar Cell Manufacturing Using Roll-To-Roll Deposition Technology	
Table 4-10	4-17
Kyocera Solar Power Applications	
Figure 4-11	4-23
Regional Power Output Levels Per kw Of Generation Using GE Solar Electric Power Systems	
Table 4-12	4-24
Solar Energy Generated as a Function of Installation Type	
Figure 4-13	4-25
Alternative Siteing of GE Solar Panels	
Figure 4-14	4-26
GE Solar Panel Pressure Clamp	

**REPORT # SH29821672      571 PAGES      140 TABLES AND FIGURES      2008****\$3,300 SINGLE COPY      \$4,300 WEB SITE HOSTING**

Table 4-15	4-30
MK Power-Tech Battery Features:	
Table 4-16	4-32
Stability Issues Related To Moisture Ingress	

**RESIDENTIAL SOLAR PANEL COMPANY PROFILES**

Table 5-1	5-5
Top Five Global Photovoltaics Producers In 2007	
Table 5-2	5-5
Recent Solar Company IPOs	
Table 5-3	5-6
Other Solar Companies	
Table 5-3 (Continued)	5-7
Other Solar Companies	
Table 5-4	5-8
Selected Photovoltaic Industry Associations	
Figure 5-5	5-10
BP Solar Country Positioning	
Figure 5-6	5-12
BP Drilling Platform	
Table 5-7	5-14
BP Revenue First Half 2008	
Table 5-8	5-19
Selected BP Solar Customers and Testimonials	
Figure 5-9	5-20
SolarWorld Educational Kits	
Figure 5-10	5-34
Flisom Thin Film Solar Positioning	
Table 5-11	5-37
GE Partners In The Solar America Initiative	
Figure 5-12	5-45
Isoton Solar Cell	
Figure 5-13	5-57
Mitsubishi Electric Group Challenging Targets	
Figure 5-14	5-58
Mitsubishi Electric Group Framework for Balanced Management	
Figure 5-15	5-75
Q-Cells AG Business and Sales Assessment	
Figure 5-16	5-78
Q-Cells Employees	
Figure 5-17	5-83
Sanyo Solar Revenue	
Figure 5-18	5-84
Sanyo Revenue by Geographical Segment	
Figure 5-19	5-85
Sanyo Overseas Revenue by Geographical Segment	
Figure 5-20	5-86
Sanyo Revenue by Geographical Segment	
Table 5-21	5-90

**WINTERGREEN RESEARCH, INC.**

Schott Solar Integrated PV Wafers	
Figure 5-22	5-92
Schott Solar Locations	
Figure 5-23	5-93
Sharp Photovoltaic Power Systems	
Figure 5-24	5-94
Sharp Photovoltaic Power Systems Capabilities	
Figure 5-25	5-95
Sharp Photovoltaic Sun Power	
Figure 5-26	5-96
Sharp Photovoltaic Capacity Enhancement of Solar Cells	
Figure 5-27	5-97
Sharp Photovoltaic Capacity Enhancement of Solar Cells	
Figure 5-28	5-98
Sharp C/O2 Reduction Effect of Solar Cells	
Figure 5-29	5-99
Sharp C/O2 Reduction Effect of Solar Cells	
Figure 5-30	5-100
Sharp C/O2 Reduction Effect of Solar Cells	
Table 5-31	5-103
Sharp Solar Partners	
Figure 5-32	5-114
SolarWorld AG Revenue	
Figure 5-33	5-115
SolarWorld AG Sales by Region	
Figure 5-34	5-117
SolarWorld AG Shareholder Structure	
Table 5-35	5-130
Significant Factors That Directly Or Indirectly Affect Suntech Financial Performance	

**RESIDENTIAL SOLAR PANELCOMPANY LISTS**

Table 6-1	6-1
Lists of Solar Companies	
Table 6-2	6-151
Note On Lists	

**REPORT # SH29821672      571 PAGES      140 TABLES AND FIGURES      2008****\$3,300 SINGLE COPY      \$4,300 WEB SITE HOSTING**

## **ABOUT THE COMPANY**

**WINTERGREEN RESEARCH**, HAS A UNIQUE RESEARCH STRATEGY THAT RELATES TO IDENTIFYING MARKET TRENDS THROUGH READING AND INTERVIEWING OPINION LEADERS. BY READING THE ELECTRONIC EQUIVALENT OF 40 FEET OF PAPER, WINTERGREEN RESEARCH SENIOR ANALYSTS CAN LEARN A LOT MORE ABOUT MARKETS, A LOT FASTER THAN CAN BE LEARNED THROUGH EXPENSIVE SURVEYS AND FOCUS GROUPS. THINKING ABOUT MARKET TRENDS IS A HIGH PRIORITY AT WINTERGREEN RESEARCH. AS WITH ALL RESEARCH, THE VALUE PROPOSITION FOR COMPETITIVE ANALYSIS COMES FROM INTELLECTUAL INPUT.

IT IS A LUXURY REALLY, AVAILABLE TO ONLY A VERY FEW PEOPLE, TO BE ABLE TO GATHER INFORMATION, LOTS OF INFORMATION FROM READING MASSIVE AMOUNTS OF CONTENT, AND THEN TRYING TO MAKE SENSE OF THAT CONTENT. THE ABILITY TO THINK ABOUT MARKET TRENDS IS ENHANCED BY DOING IT OVER AND OVER FOR MANY DIFFERENT MARKETS. THAT IS WHAT WINTERGREEN RESEARCH IS ALL ABOUT: READING AND THINKING IS AN ESSENTIAL ASPECT OF COMPETITIVE ANALYSIS. TALKING TO OPINION LEADERS IS THE THIRD ESSENTIAL ASPECT OF PRODUCING GOOD, RELIABLE DATA.

**WINTERGREEN RESEARCH**, FOUNDED IN 1985, PROVIDES STRATEGIC MARKET ASSESSMENTS IN TELECOMMUNICATIONS, COMMUNICATIONS EQUIPMENT, HEALTH CARE, INTERNET AND ADVANCED COMPUTER TECHNOLOGY. INDUSTRY REPORTS FOCUS ON OPPORTUNITIES THAT EXPAND EXISTING MARKETS OR DEVELOP MAJOR NEW MARKETS. THE REPORTS ASSESS NEW PRODUCT AND SERVICE POSITIONING STRATEGIES, NEW AND EVOLVING TECHNOLOGIES, AND TECHNOLOGICAL IMPACT ON PRODUCTS, SERVICES, AND MARKETS. MARKET SHARES ARE PROVIDED. LEADING MARKET PARTICIPANTS ARE PROFILED, AND THEIR MARKETING STRATEGIES, ACQUISITIONS, AND STRATEGIC ALLIANCES ARE DISCUSSED. THE PRINCIPALS OF WINTERGREEN RESEARCH HAVE BEEN INVOLVED IN ANALYSIS AND FORECASTING OF INTERNATIONAL BUSINESS OPPORTUNITIES IN TELECOMMUNICATIONS AND ADVANCED COMPUTER TECHNOLOGY MARKETS FOR OVER 30 YEARS.

**REPORT # SH29821672      571 PAGES      140 TABLES AND FIGURES      2008**  
**\$3,300 SINGLE COPY      \$4,300 WEB SITE HOSTING**

**ABOUT THE PRINCIPAL AUTHORS**

**ELLEN T. CURTISS**, TECHNICAL DIRECTOR, CO-FOUNDER OF WINTERGREEN RESEARCH, CONDUCTS STRATEGIC AND MARKET ASSESSMENTS IN TECHNOLOGY-BASED INDUSTRIES. PREVIOUSLY SHE WAS A MEMBER OF THE STAFF OF ARTHUR D. LITTLE, INC., FOR 23 YEARS, MOST RECENTLY AS VICE PRESIDENT OF ARTHUR D. LITTLE DECISION RESOURCES, SPECIALIZING IN STRATEGIC PLANNING AND MARKET DEVELOPMENT SERVICES. SHE IS A GRADUATE OF BOSTON UNIVERSITY AND THE PROGRAM FOR MANAGEMENT DEVELOPMENT AT HARVARD GRADUATE SCHOOL OF BUSINESS ADMINISTRATION. SHE IS THE AUTHOR OF RECENT STUDIES ON WORLDWIDE TELECOMMUNICATIONS MARKETS, THE TOP TEN INTERNET EQUIPMENT COMPANIES, THE TOP TEN CONTRACT MANUFACTURING COMPANIES, AND THE TOP TEN TELECOMMUNICATIONS MARKET ANALYSIS AND FORECASTS.

**SUSAN EUSTIS**, PRESIDENT, CO-FOUNDER OF WINTERGREEN RESEARCH, HAS DONE RESEARCH IN COMMUNICATIONS AND COMPUTER MARKETS AND APPLICATIONS. SHE HOLDS SEVERAL PATENTS IN MICROCOMPUTING AND PARALLEL PROCESSING. SHE HAS THE ORIGINAL PATENTS IN ELECTRONIC VOTING MACHINES. SHE HAS NEW PATENT APPLICATIONS IN FORMAT VARYING, MULTIPROCESSING, AND ELECTRONIC VOTING. SHE IS THE AUTHOR OF RECENT STUDIES OF THE REGIONAL BELL OPERATING COMPANIES' MARKETING STRATEGIES, INTERNET EQUIPMENT, BIOMETRICS, A STUDY OF INTERNET EQUIPMENT, WORLDWIDE TELECOMMUNICATIONS EQUIPMENT, TOP TEN TELECOMMUNICATIONS, DIGITAL LOOP CARRIER, WEB HOSTING, WEB SERVICES, AND APPLICATION INTEGRATION MARKETS. MS. EUSTIS IS A GRADUATE OF BARNARD COLLEGE.

WINTERGREEN RESEARCH, INC.

ORDER FORM

Return To: WinterGreen Research, Inc.  
6 Raymond Street  
Lexington, MA 02421 USA  
Phone: (781) 863-5078 --- Fax: (781) 863-1235 or (781) 860-0897

PLEASE ENTER MY ORDER FOR:

**Residential Solar Panel Market Opportunities,  
Strategies, and Forecasts 2008-2014**

*-ALL REPORTS ARE AVAILABLE IN EITHER PRINT OR PDF-*

*PDF PRINT*

\_\_\_ ENCLOSED IS MY CHECK FOR \$3,300 FOR SINGLE COPY, \$4,300 FOR WEB SITE POSTING

\_\_\_ PLEASE BILL MY COMPANY USING P.O. NUMBER \_\_\_\_\_

\_\_\_ PLEASE CHARGE MY MASTERCARD/VISA/AMERICAN EXPRESS—

CARD NUMBER \_\_\_\_\_ EXP. DATE \_\_\_\_\_

If charging to a Credit card you may e-mail the order form, but not the card information

Fax or Call with credit card information - Do not send card number as e-mail - You may send the order as e-mail

\_\_\_ ADDITIONAL COPIES, @ \$375 (EXTRA COPY PRICE IN EFFECT ONLY WITH INITIAL ORDER)

NAME \_\_\_\_\_ TITLE \_\_\_\_\_

SIGNATURE \_\_\_\_\_

COMPANY \_\_\_\_\_ DIVISION \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE / ZIP \_\_\_\_\_

TELEPHONE \_\_\_\_\_

FAX \_\_\_\_\_

EMAIL \_\_\_\_\_

*PLEASE NOTE:* RESIDENTS OF MASSACHUSETTS AND CONNECTICUT MUST INCLUDE APPROPRIATE SALES TAX

SUBSCRIBERS OUTSIDE THE UNITED STATES MUST PROVIDE PREPAYMENT IN U.S. FUNDS

REPORT # SH29821672 571 PAGES 140 TABLES AND FIGURES 2008

\$3,300 SINGLE COPY \$4,300 WEB SITE HOSTING